

# A Climate of Scarcity: Electricity in India, 1899–2016

Elizabeth Chatterjee

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## I. Introduction<sup>1</sup>

In August 2016 a working group of the International Commission on Stratigraphy provisionally recommended that the current time interval be renamed to recognize the new geological ‘age of mankind’: the Anthropocene. Interpretations of the new epoch are hotly contested. Nonetheless, at the heart of many popular and historical understandings of the new era lies a dilemma of abundance.

The mainstream historical narrative locates the key moment of the Anthropocene’s emergence in the West around 1800 with the invention and spread of steam engines. In this account, the modern economy was founded on the shattering of the old Malthusian constraints imposed by the natural world. Britain tore past its previously successful counterparts in Asia, thanks in large part to its access to abundant land and especially coal.<sup>2</sup> This fossil-fuel revolution, and its second waves based on electricity and oil, brought with it the promise of apparently endless economic growth. Such a narrative has been echoed both by climate scientists

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<sup>2</sup> Kenneth Pomeranz, *The Great Divergence: Europe, China, and the Making of the Modern World Economy* (Princeton, NJ: Princeton University Press, 2000); E.A. Wrigley, *Energy and the English Industrial Revolution* (Cambridge: Cambridge University Press, 2010). At least until the Anthropocene Working Group announced that it provisionally favoured an official start-date around 1950, the emphasis on Europe around 1800 was the ‘dominant scholarly consensus’ on the Anthropocene; see Alan Mikhail, ‘Enlightenment Anthropocene,’ *Eighteenth-Century Studies* 49, no. 2 (2016): 222 and references therein.

and by perhaps the most influential critique of the Anthropocene to come out of the humanities thus far: the claim that the new era's hallmark was the emergence of the steam-driven capitalist socioeconomic system—'fossil capitalism'—and that it might therefore be more accurately labelled the 'Capitalocene'.<sup>3</sup> While the Anthropocene Working Group has shifted instead towards a date around 1950, economic historians have continued to argue that 'the decisive process was that which launched what became the incomplete but worldwide spread of industrialization'.<sup>4</sup>

All this came at the cost of environmental and social degradation. The apparent material abundance enjoyed by Western elites in particular was revealed to be running headlong into systemic planetary limits, limits which do not neatly coincide with 'peak' coal, oil, or natural gas. This is the popular tragedy of the Anthropocene, and the root of fundamental debates about the future of economy and society, at least in the global North: 'we cannot agree on whether the world we relate to is one fundamentally defined by scarcity (and thus limits) or by abundance (and thus unlimited potential).'<sup>5</sup>

But what of the world beyond the northwestern corner of Europe and its North Atlantic offshoot? Imitating standard, Enlightenment-tinged accounts of 'the birth of the modern world', the influential 'Capitalocene' thesis that dominates the still-emergent economic history literature on the Anthropocene locates virtually all the key actors—inventors, colonialists, and capitalists—in Europe and the United States. The fossil economy's beneficiaries are depicted as

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<sup>3</sup> Andreas Malm and Alf Hornborg, 'The Geology of Mankind? A Critique of the Anthropocene Narrative,' *Anthropocene Review* 1, no. 1 (2014); Andreas Malm, *Fossil Capital: The Rise of Steam Power and the Roots of Global Warming* (London; New York: Verso, 2016). The most vociferous exponent of the 'Capitalocene' label, Jason W. Moore, emphasizes the opening of the New World colonies over coal, but abundance in the Euro-Atlantic world still lies at the heart of his account; see *Capitalism in the Web of Life: Ecology and the Accumulation of Capital* (London; New York: Verso, 2015).

<sup>4</sup> Gareth Austin, 'Introduction,' in *Economic Development and Environmental History in the Anthropocene: Perspectives on Asia and Africa*, ed. Gareth Austin (London: Bloomsbury Academic, 2017), 6. The impact of the Capitalocene thesis likely owes much to lack of competition, given the persistent gulf between economic and environmental history.

<sup>5</sup> Joshua J. Yates, 'Abundance on Trial: The Cultural Significance of Sustainability,' *Hedgehog Review* 14, no. 2 (2012): 22–23.

an industrial and commercial elite minority, in contradistinction to the mass of the population. Beyond this heartland, the rest of the world features largely as a passive resource pool<sup>6</sup> or imitators of a peculiarly Euro-American development model. Such literature often assumes a neat process whereby fossil capitalism was transmitted from northwest Europe to its colonial peripheries, either through a process of mechanistic diffusion—the “westernisation” of the world<sup>7</sup>—or via coercion by ‘a clique of white British men’.<sup>8</sup> This is perhaps unsurprising, given that its authors are typically specialists on early modern or Victorian Europe, but it neglects a rich body of revisionist history on the economy, the environment, and technological development in the global South.

This chapter suggests that in its focus on abundance the Capitalocene thesis misdiagnoses both the dynamics of fossil capitalism’s spread beyond its original heartlands, and the degree of hegemony and coherence it displayed thereafter. Late development is a condition characterized by new forms of and a new consciousness of scarcity—of remaining behind in the waiting room of Malthusian subsistence while the elites of the developed world revel in the new material surfeit. Indeed, the starting point for one recent collection was the speculation that scarcity acts as a totalizing discourse of modernity in the global South in the way that risk does in the North, naturalizing a turn to scientific and technological fixes.<sup>9</sup> If abundance was the precondition of the Euro-American fossil economy, how did fossil capitalism spread and

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<sup>6</sup> This is true even of one recent attempt to grant colonialism a central place in the Capitalocene narrative, the idea of the ‘Plantationocene’, in which world history is read off the unusual colonial experience of the Americas. See Donna Haraway, ‘Anthropocene, Capitalocene, Plantationocene, Chthulucene: Making Kin,’ *Environmental Humanities* 6, no. 1 (2015): 162.

<sup>7</sup> Elmar Altvater, ‘The Social and Natural Environment of Fossil Capitalism,’ in *Coming to Terms with Nature: Socialist Register 2007*, ed. Colin Leys and Leo Panitch (London; New York; Halifax: Merlin Press, 2007), 37. See similarly Christophe Bonneuil and Jean-Baptiste Fressoz, *The Shock of the Anthropocene* (London; New York: Verso, 2016). As Julia Adeney Thomas argues in her forthcoming review of the latter for *Social History*: ‘The old diffusionist model of “human technology” arising exclusively in the West until the 1850s when it “reached a global scale” is recuperated without acknowledging the research dislodging this Eurocentric modernization narrative.’

<sup>8</sup> Malm and Hornborg, ‘Geology of Mankind?’, 3; Malm, *Fossil Capital*, 267.

<sup>9</sup> Lyla Mehta, ed. *The Limits to Scarcity: Contesting the Politics of Allocation* (London; Washington, DC: Earthscan, 2010), xxi. The volume concluded that this is true of the global North too, and deconstructed the universalized notion of scarcity across multiple regional settings.

develop in settings where scarcity was the norm? Were the beneficiaries of the fossil economy always fossil capitalists, and to what degree did they succeed in ensuring that electricity was governed along recognizably capitalist lines? More fundamentally, can Northern living standards be universalized for the South's huge populations without asphyxiating humankind, or must the latter be expected to embrace comparative scarcity voluntarily?

To answer these questions this chapter focuses on India, now a key case as the world's third-largest national carbon emitter, and takes as its lens the spread of electrification. On-grid, utility-scale electricity was *the* great macro-technology of the twentieth-century fossil economy (and a critical enabler of the twenty-first-century knowledge economy), a crucial input that reshaped capitalism from factory technologies to the rise of finance. It also lies at the intersection of fossil capitalism and distributive politics, touching virtually every dimension of everyday life, at least in electrified areas. Finally, power generation is now the single largest source of anthropogenic carbon emissions worldwide, placing it at the centre of the contemporary environmental crisis. The history of electricity in India therefore provides a rich case through which to view one trajectory of fossil capitalism beyond its Atlantic origins and into the postcolonial era.

The following analysis first examines how this crucial macro-technology of fossil capitalism arrived in India (Section 2). Against the assumption of a seamless dissemination of the fossil economy, the elements of colonialism, fossil capitalism, and rising energy consumption did not neatly align before 1947, the year of Indian independence. Outside favoured elite pockets the imperial regime was largely indifferent to electrification, which instead often relied on local initiative and capital. In this way colonialism helped to produce a new consciousness of scarcity, as power became a crucial industrial input and, for nationalists, a defining characteristic of the modernity that the colonial regime denied its peripheries.

Yet, against the emphasis on corporate, export-driven manufacturing that so preoccupies Capitalocene theorists,<sup>10</sup> it was not only industrial capitalism that relied upon fossil fuels. Agriculture, infrastructure, lighting, welfare provision, urban life, household labour, public communication, and even democracy have also become increasingly dependent upon energy abundance. We might thus more accurately analyse the spread of a broader *fossil developmentalism* than fossil capitalism.

The chapter therefore turns to explore how the persistent scarcity of electricity came to intersect with fossil developmentalism in the formally democratic context of postcolonial India, examining this question from first a society-centric and then a state-centric perspective. Against the Capitalocene emphasis on the hegemony of industrial and commercial capitalists and the seemingly inexorable process of the commodification of natural resources, political pressures to obtain scarce power came to be exercised both within and without the democratic process in ways that often undermined fossil capitalists' access to electricity in favour of agricultural and residential consumers (Section 3), and subverted attempts to impose conventional economic rationality on bureaucratic power governance (Section 4). As this suggests, it is important to separate out a 'hard', absolute scarcity of electricity (the quantity of power *generated*) from the 'soft' scarcity created through the unequal politics of its frontline *distribution*, which creates asymmetric shortages for different categories of consumer; both types of scarcity are socially produced—though they are also inseparable from natural resource constraints and electricity's physical characteristics—but their policy implications are quite different. Neither the political economy nor the governing logic of the Indian electricity supply industry is well captured by Capitalocene historiography derived from Euro-American experiences. Defined by endemic scarcities, the history of electrification in India thus illustrates the complexity of the much-

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<sup>10</sup> See especially Malm, *Fossil Capital*.

debated relationships between energy abundance and colonialism, fossil capitalism, and democracy outside the global North.

## 2. Generating scarcity: electricity in the colonial era

Mainstream Anthropocene-Capitalocene literature condemns colonialism for spreading carbon-intensive technologies such as '[t]rans-continental canals, railways, steamships, docks, grain silos and telegraph lines', as noted above.<sup>11</sup> But did European colonialism really lead to such a neat diffusion of fossil capitalism? A substantial body of revisionist economic and environmental history scholarship suggests this is too simplistic: even if it did not actively encourage *deindustrialization*, colonialism did not simply gift capital- and energy-intensive development to its peripheries.<sup>12</sup>

This is especially true if we move beyond the 'canonical' technologies of empire such as railways and telegraphs to examine *absences* in the archival record and on the ground alike. No absence is more notable than electricity. Electrification, as the political scientist Sunila Kale recently noted, was largely 'incidental' to imperialism into the early twentieth century—and therefore to subsequent historical scholarship on the British Empire.<sup>13</sup>

Colonial India illuminates the limits of imperial interest. In the capital, the Calcutta Electric Supply Corporation (CESC) began operations in 1899, only 17 years after London and New York's first generating stations. But outside colonial residential zones, military complexes, and industrial belts around the major cities, electrification was rare. Before 1920 the limited capacity additions that did materialize were generally used more to regulate the population—

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<sup>11</sup> Bonneuil and Fresco, *Shock*, 238.

<sup>12</sup> In India the deindustrialization debate dates back to the early nationalist movement. It remains much contested, especially around textiles. Even if colonialism did not crush local production, as sceptics suggest, technological transfer was clearly limited; see Tirthankar Roy, *The Economic History of India, 1857–1947* (New Delhi; Oxford: Oxford University Press, 2000), 114–53.

<sup>13</sup> Sunila S. Kale, 'Structures of Power: Electrification in Colonial India,' *Comparative Studies of South Asia, Africa and the Middle East* 34, no. 3 (2014): 455.

lighting prisons, government offices, arms factories, and lighthouses—rather than directly prioritizing economic development in the fossil-capitalist mode.<sup>14</sup> There was a slow, regionally differentiated take-off of hydroelectric projects from the 1920s. Nonetheless, senior officials often remained indifferent, despite growing calls from local elites—both Indian and occasionally colonial—to install grids and support new provincial generation capacity.

The situation was somewhat better in some princely States, such as Mysore under the celebrated administration of M. Visvesvaraya, or in Bombay, where a hydroelectric plant owned by the local entrepreneurial Tata dynasty contributed half of all India's installed capacity as late as 1917.<sup>15</sup> As this suggests, indigenous rulers, officials, entrepreneurs, and investors were crucial in electricity's early spread. The share of foreign ownership in installed generation capacity correspondingly fell from around 80 percent in 1913-14 to only 31 percent in 1928-32.<sup>16</sup> This was no passive process of technological 'diffusion', but a collaborative process in which local capital and initiative played a key role.

Cultural diffusion and skill transfers did not seamlessly accompany the geographical relocation of technologies, however. Torn between a dearth of imported personnel and scepticism about Indians' technical abilities, the colonial regime was slow to encourage engineering education.<sup>17</sup> Senior engineers, even in Indian utilities, were often British, German, or American, and even after independence India continued to rely on imported technology and foreign or multinational technical expertise for some years. British engineers and managing agencies stayed on in some utilities well into the 1950s.

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<sup>14</sup> Srinivasa Rao and John Lourdasamy, 'Colonialism and the Development of Electricity: The Case of Madras Presidency, 1900-47,' *Science, Technology & Society* 15, no. 1 (2010): 29-33.

<sup>15</sup> *Ibid*; Kale, 'Structures of Power.'

<sup>16</sup> William J. Hausman, Peter Hertner, and Mira Wilkins, *Global Electrification: Multinational Enterprise and International Finance in the History of Light and Power, 1878-2007* (Cambridge; New York: Cambridge University Press, 2008), 32.

<sup>17</sup> See Daniel R. Headrick, *The Tentacles of Progress: Technology Transfer in the Age of Imperialism, 1850-1940* (New York; Oxford: Oxford University Press, 1988).

As a result, in 1947 the entire generation capacity of the Indian electricity sector stood at a mere 1,362 MW, less than 0.5 percent of installed capacity in 2016. One historian concludes: ‘At the time of its Independence, India had an electrical industry which reached the level of European nations just before 1914’; the reason it did not opt for full nationalization was ‘that there was actually nothing much to nationalize’.<sup>18</sup> This underdevelopment was castigated by nationalists, who argued in 1938 that electricity was ‘the very life blood of the industrial nation which must flow abundantly and without interruption if the nation’s strength and well-being are to be preserved’.<sup>19</sup> Even Gandhians, often parodied as hostile to every trapping of industrial modernization, recognized the practical benefits of large-scale power generation.<sup>20</sup>

India’s fate strikingly contrasted with that of Japan. The latter quickly developed a prodigious local electricity industry and by 1935 had electrified 89 percent of households, significantly outstripping Britain and the United States.<sup>21</sup> This was in spite of a lack of natural resources in some ways even more striking than that of India. Asian societies were evidently more than able to assimilate electrical technologies outside colonial control. The continent’s divergent histories of electrification again suggest the significance of imperial ambivalence about technological transfer to the colonies, as well as the heterogeneity of non-Western energy histories.

Instead of a simplistic and linear process of diffusion, then, the electric avatar of Euro-American-style fossil capitalism arrived in India haphazardly, reluctantly, and belatedly; and it was translated into new contexts with the collaboration of indigenous players. As the novelist Amitav Ghosh recently argued, in relation to climate change ‘it is demonstrably the case that the

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<sup>18</sup> Pierre Lanthier, ‘From the Raj to Independence: British Investment in the Indian Electricity Sector,’ *Utilities Policy* 29 (2014): 46, 49.

<sup>19</sup> K.T. Shah, *Power and Fuel: Report of the Sub-Committee*, Indian National Congress Planning Committee (Bombay: Vora, 1949), 71.

<sup>20</sup> Michael Adas, *Dominance by Design: Technological Imperatives and America’s Civilizing Mission* (Cambridge, MA: Belknap Press of Harvard University Press, 2006), 273.

<sup>21</sup> Brett L. Walker, *A Concise History of Japan* (Cambridge: Cambridge University Press, 2015), 174.



imperatives of capital and empire have often pushed in different directions, sometimes producing counter-intuitive results'.<sup>22</sup> The history of electricity in India thus provides a much more ambivalent account of colonialism and its relationship to industrial capitalism and climate change than that admitted by historians of the 'Capitalocene'.

More than this, there were already signs that electricity's role in postcolonial India was to be expanded well beyond private industry. B.R. Ambedkar—famous as the leading advocate for India's Dalits (former 'untouchables') and later the principal drafter of India's constitution, but who also chaired the committee on public utilities and electricity under the colonial regime—declared in a 1943 speech that 'without cheap and abundant electricity no effort for the industrialization of India can succeed'. This was not for the sake of capitalist enterprise, Ambedkar emphasized: 'we want industrialization in India as the surest means to rescue the people from the eternal cycle of poverty in which they are caught'.<sup>23</sup> The stage was set for the shift from narrow fossil capitalism towards a far more ambitious vision of fossil developmentalism that would draw quite different constituencies into its ambit.

### 3. Democratizing scarcity: the politics of allocation

At independence, then, India inherited a new, hitherto unimagined scarcity in electricity. This was exacerbated by a series of related and overlapping scarcities in technology, skilled personnel, capital, and wealthy consumers willing and able to pay for service. Yet if the Japanese counterexample appears to suggest a link between national sovereignty and the uptake of electricity, the shift from colonial autocracy to democratic independence in India would not neatly provision fossil capitalists with electricity. The new government's developmental vision

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<sup>22</sup> Amitav Ghosh, *The Great Derangement: Climate Change and the Unthinkable* (Gurgaon, India: Allen Lane, 2016), 117.

<sup>23</sup> Quoted in Sunila S. Kale, *Electrifying India: Regional Political Economies of Development* (Stanford, CA: Stanford University Press, 2014), 32.

and democratic politics instead intersected with these multiple scarcities in complex ways, undermining the consolidation of fossil capitalism even while fostering the broader spread of fossil developmentalism beyond private industry.

If the relationship between colonialism and fossil capitalism is an ambivalent one, the connection between fossil capitalism and democracy is even more fraught. Several scholars have suggested it is no coincidence that the expansion of formal rights and the advent of fossil capitalism broadly coincided in western Europe. Dipesh Chakrabarty has argued that ‘[t]he mansion of modern freedoms stands on an ever-expanding base of fossil-fuel use’.<sup>24</sup> It does seem that some minimum level of individual wealth and consumption is generally necessary for democracy’s consolidation: political-science orthodoxy predicts that democracy is much more likely to survive in wealthier countries—where, almost universally, energy consumption is higher.<sup>25</sup> The mainstays of *substantive* democratic engagement—basic health, education, public safety, political communication, mass media, even voting itself—are all facilitated by electrification. Turning from energy consumption to production, Timothy Mitchell has (controversially) argued for a more direct link, contending that democracy’s development owed much to the physical characteristics of the coal industry and its empowerment of the labour movement, even as the shift to oil has undermined democracy in turn: ‘Fossil fuels helped create both the possibility of modern democracy and its limits.’<sup>26</sup> To complicate matters, this is a two-way relationship: drawing on satellite light data, Brian Min finds that democracies are in general

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<sup>24</sup> Dipesh Chakrabarty, ‘The Climate of History: Four Theses,’ *Critical Inquiry* 35, no. 2 (2009): 208.

<sup>25</sup> Seymour Martin Lipset, ‘Some Social Requisites of Democracy: Economic Development and Political Legitimacy,’ *American Political Science Review* 53, no. 1 (1959). The democratic deconsolidation occurring in some advanced economies today might call this into question, of course.

<sup>26</sup> Timothy Mitchell, *Carbon Democracy: Political Power in the Age of Oil* (London: Verso, 2011), 1, 12–27. By attributing mass mobilization to the structure of the coal industry, Mitchell’s materialism ignores the long pre-mining history of labour activism with its many alternative sources of radicalism. I am grateful to Fredrik Albritton Jonsson for this point.

more likely to provide electricity than authoritarian states.<sup>27</sup> Energy consumption thus facilitated both the development and the consolidation of democracy, while democracy in turn encouraged a broadening of electricity consumption.

In such terms, India is an outlier. There universal voting rights preceded a dramatic take-off of economic development, widespread literacy, or per capita energy consumption, and yet formal democracy was successfully consolidated.<sup>28</sup> The very fact of democracy's survival in India thereby defies conventional wisdom, let alone the Capitalocene thesis. How, then, did fossil capitalism and democracy intersect in a situation where multiple scarcities persisted?

Examining the contrast between the famines of colonial India and independent India's relative freedom from dramatic starvation, Amartya Sen famously argued that food scarcity is often socially produced.<sup>29</sup> He thereby usefully shifted attention from supply to questions of access and distribution—though subsequent scholars have noted that while sensational famines ceased, democratic India has failed to solve the problem of chronic malnutrition.<sup>30</sup> The Indian power sector, too, has witnessed a slow-burning crisis virtually from independence. Yet, as in the case of food, this has not been solely a question of increasing overall supplies. As one commentator noted, from 1947 India consistently invested substantial sums in electricity; the sector is not at the global technological frontier and so catch-up should not have been difficult; and the country boasted a number of energy experts, often producing official reports that astutely diagnosed the sector's difficulties.<sup>31</sup> As in the case of food, then, the interaction of

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<sup>27</sup> Brian Min, *Power and the Vote: Elections and Electricity in the Developing World* (New York: Cambridge University Press, 2015).

<sup>28</sup> The exception is the 21-month Emergency of 1975-7, Indira Gandhi's brief suspension of formal democracy. During this time electricity featured as a weapon of both state coercion and populism: one of Mrs Gandhi's first moves was to cut power supplies to major newspapers, while her 20-point programme promised rapid electrification.

<sup>29</sup> *Poverty and Famines: An Essay on Entitlement and Deprivation* (Oxford: Clarendon Press, 1981). See also Mehta, this volume.

<sup>30</sup> Dan Banik, *Starvation and India's Democracy* (London: Routledge, 2007).

<sup>31</sup> Thomas B. Smith, 'India's Electric Power Crisis: Why Do the Lights Go Out?,' *Asian Survey* 33, no. 4 (1993): 376-7.

democracy and scarcity in India means that the sector's difficulties have more often revolved around distribution than simple supply—literally in this case, around the ‘last mile’ of low-voltage electricity distribution to different categories of consumers. The fundamental drivers of this power crisis lay not (only) in an absolute scarcity of power generated, but in the politics of allocation that developed around access to the limited electricity supply, and which in turn helped to drive the sector further into crisis.

Worldwide, the post-war years witnessed rapid expansion of physical electricity assets within broadly state-owned frameworks. A commitment to fossil capitalism was no prerequisite: the Soviet Union's first-ever strategy for state-led development and the prototype for later Five-Year Plans, the GOELRO plan, focused on a distinctively centralized mode of electrification as the pillar of economic modernization, although not until after 1926 did it accelerate (from a very low, foreign-dominated base under tsarist rule).<sup>32</sup> Lenin's famous formula for communism, ‘soviet power plus the electrification of the whole country’, would later be frequently invoked in India's Constituent Assembly debates around independence. India's installed capacity grew eightfold and actual generation tenfold during the first two decades of its own Five-Year Plan system. During these early years, electrification continued to follow the patterns of privilege established in the colonial period. As in the global North, industrial consumers' bulk tariffs were lower than those of residential consumers, in accordance with Nehruvian India's intensifying vision of economic development driven by heavy industry, the public sector, and technological

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<sup>32</sup> Jonathan Coopersmith, *The Electrification of Russia, 1880–1926* (Ithaca; London: Cornell University Press, 1992), 151–91. Nonetheless, the broad relationship between democracy and electrification holds true in the longer term: a large-*n* study found that, while poor countries experienced legacy infrastructural benefits from central planning, across formerly planned economies this came at the cost of long-term ‘quality handicaps’; see Wendy Carlin, Mark Schaffer, and Paul Seabright, ‘Soviet Power Plus Electrification: What Is the Long-Run Legacy of Communism?’, *Explorations in Economic History* 50, no. 1 (2013): 134.

progress.<sup>33</sup> The icon of this development in the early phase was non-fossil, however: mega-scale hydroelectric dams, Nehru's famous 'temples of modern India'.

Yet, as in the wider economy and society, the need to accommodate non-industrial elites began to undermine the Nehruvian project of socioeconomic transformation.<sup>34</sup> A distinctly different tariff pattern began to emerge from the mid-1960s, as non-industrial users instead received increasingly large subsidies. Much of the inter- and post-war world had granted power policy an increased emphasis on social objectives and distribution goals rather than narrow profitability. In India power had already been bracketed in the same ministry as irrigation, and the rise of concerns about food security after the droughts of the 1960s only solidified this linkage. The ensuing Green Revolution policies helped to spread irrigated agriculture via electric tubewells and pumpsets; their numbers leapt from 192,000 in 1960-1 to over 1 million in 1968-9, solidifying an 'energy-irrigation nexus'. Agricultural power consumption grew at an annual average compound rate of over 14 percent in the decade after 1960-1. India thereby became the largest groundwater user in the world, dwarfing even the United States and China and creating a burgeoning environmental crisis.

If cross-subsidization in, for example, the United States had sought to accelerate the electrification of the most marginal rural households, in India the subsidies 'leaked' to wealthier recipients. This was not accidental. India had inherited from the British a federal division of powers over electricity, confirmed in the much-debated Electricity (Supply) Act of 1948.<sup>35</sup> This left the crucial distribution segment in the hands of State-level governments. The key institutions

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<sup>33</sup> While the 1956 Industrial Policy Resolution confirmed public-sector dominance of electricity, pre-existing private generation firms such as CESC continued to be tolerated. On the 'fetishistic' reliance of the Nehruvian regime on massive monuments to modernity and scientific progress such as mega-dams and atomic reactors, see Itty Abraham, *The Making of the Indian Atomic Bomb: Science, Secrecy and the Postcolonial State* (London; New York: Zed Books, 1998).

<sup>34</sup> The classic exposition of this argument is Francine R. Frankel, *India's Political Economy, 1947-1977: The Gradual Revolution* (Princeton; Guildford: Princeton University Press, 1978).

<sup>35</sup> For an excellent analysis of this federal settlement and the regionally variegated political economies it fostered, see Kale, *Electrifying India*.

were State electricity boards (SEBs), vertically integrated monopolies usually lacking insulation from political administrations. As Min suggests, policymakers who must rely on reelection are more likely to provide public goods than their insulated, unelected counterparts—and where possible they will seek to leverage this provision for electoral gain.<sup>36</sup>

Accordingly, the rural shift in tariffs was regionally variegated. It was especially striking in States where farmer lobbies were powerful, such as Punjab, Haryana, Tamil Nadu, Gujarat, western Maharashtra, and western Uttar Pradesh. In the 1960s these groups formed the bedrock of the earliest resistance to the ruling Congress's one-party dominance at the national level. If farmers mobilized to protect their interests, State-level politicians—often drawn from wealthy agrarian classes themselves—in turn benefited electorally from catering to this powerful voting bloc. In the context of increasing party-political competition, agricultural power subsidies became a recognized political idiom. Their origins appear to lie in Punjab, where the Congress lost its majority for the first time in 1967; the administration introduced flat-rate (unmetered) consumption the following year, a practice that quickly spread to other politically competitive States.<sup>37</sup> Less dramatically, too, middle-class residential consumers underpaid for their power, though their growing size made this subsidy a substantial financial burden upon State governments.<sup>38</sup> Once introduced, power subsidies only reinforced the strength of farmer and

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<sup>36</sup> Min, *Power and the Vote*.

<sup>37</sup> For example, by the early 1970s Tamil Nadu saw fierce competition between two regional parties, each offering ever lower agricultural tariffs; Andhra Pradesh followed later that decade with its own brand of competitive 'electric populism'; see Kale, *Electrifying India*, 170, 142. Conversely, one-party communist dominance in West Bengal between 1977 and 2011 helped to facilitate higher agricultural tariffs there than elsewhere; see Elizabeth Chatterjee, 'The Politics of Electricity Reform', *World Development* 104: 128–139 (2018).

<sup>38</sup> Although farmer subsidies have received most scholarly attention, domestic subsidies remain sizeable. In 2010, 87 percent of all residential electricity consumption was subsidized, accounting for almost a quarter of all consumption and 0.4 percent of GDP. In 2011–12, the all-India average tariff for domestic consumers was 314 paise/kWh, compared to 144 for agricultural, 514 for industrial, and 690 for commercial consumers. Domestic subsidies were estimated to cost Rs. 37,047 crore nationwide, compared to Rs. 57,901 crore for agricultural subsidies. Data from Kristy Mayer, Sudeshna Ghosh Banerjee, and Chris Trimble, *Elite Capture: Residential Tariff Subsidies in India* (Washington, DC: World Bank, 2015), 32, ix; Planning Commission, *Annual Report (2013–14) on the Working of State Electricity Boards & Electricity Departments* (New Delhi: Government of India, 2014), 195, 208–11.

middle-class groups, and politicians' incentives to continue delivering the subsidies as a symbol of their commitment to such interests. Farmers were swift to mobilize around any threat to reduce subsidies through protest marches and other extra-electoral action, while politicians competing for votes drove tariffs ever lower—virtually to zero, as in Tamil Nadu. At the same time the Nehruvian preference for mega-dams increasingly ran into opposition from landholders and environmentalists alike, accelerating the country's turn towards coal (nationalized in 1971–3 in the name of improved productivity and working conditions).

This pattern of consumer subsidies looked quite different to that which predominated in the global North, where industrial and commercial consumers—fossil capitalists—continued to be favoured with cheap bulk tariffs. Instead, the older urban bias of Indian power policy was increasingly replaced by rural bias. Industrialists came to cross-subsidize this system through some of the world's highest power tariffs. Accordingly, one of the most celebrated analyses of India's political economy in the 1980s treated power subsidies as an archetypical symptom of the strength of wealthy farmers as they competed for state favours against India's two other 'dominant proprietary classes', industrial capitalists and the professional bureaucracy, the three classes together driving the state towards financial profligacy.<sup>39</sup> As this suggested, the dominance of fossil capitalists was strongly challenged by other groups in ways which commodified electricity, treating it as an entitlement rather than a paid service. Nonetheless, these rival groups were also elite. Even where they sought to use democratic channels to secure their influence, then, electric scarcity was far from democratic.

Alongside skewed tariffs, this politics of scarcity also had more informal forms. First, electricity theft became virtually ubiquitous: almost 60 percent of Delhi's power was going

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<sup>39</sup> Pranab Bardhan, *The Political Economy of Development in India*, expanded edition (Delhi: Oxford University Press, 1998), 129–30. On the resilience of this political economy of subsidies into the twenty-first century, see Elizabeth Chatterjee, 'The Limits of Liberalization: The Power Sector', in *India's Political Economy*, ed. R. Nagaraj and Sripad Motiram (New Delhi: Cambridge University Press, 2017).

missing before the city privatized its electricity sector in 2002. The sheer quantity of stolen power suggested that poor users were less culpable than wealthy urban dwellers and even some industrialists. While illegal connections ('hooking') and amateur fraud (meter tampering) were contributors to this theft, frontline professionals also often received payoffs to reduce long waits for new connections or refuse bill payments.<sup>40</sup> Rising levels of theft around elections confirm that this theft was institutionally tolerated and politicized.<sup>41</sup>

Second, in the context of scarce supply power officials made strategic choices about managing demand through 'load shedding', or deliberate power cuts. While in some cases this targeted areas with high levels of power theft, it often spared politically influential constituencies or areas where politicians lived. At times this took the form of a 'zero-sum game' between industrial and more numerous users, with government-mandated power cuts targeting industrial rather than agricultural consumers.<sup>42</sup> The economic impact on industry was substantial. Many larger firms resorted to their own captive generation to reduce dependence on the irregular and expensive public system.

By 1991, the year of India's 'big-bang' economic reforms, the result was a politically stable but economically and environmentally dysfunctional system. There developed a self-perpetuating cycle of scarcity: cost under-recoveries from theft and subsidized consumption led to mounting financial losses and thus to dramatic shortages of cash for reinvestment; the ensuing poor performance further reduced consumers' willingness to pay. The gap between demand and supply widened, while more than a half-century after independence the 2001 census found that only 55.8 percent of households used electricity as their primary lighting

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<sup>40</sup> Thomas B. Smith, 'Electricity Theft: A Comparative Analysis,' *Energy Policy* 32, no. 18 (2004). Robert Wade's classic analyses of irrigation suggest that this was merely the street level of an elaborate system of corruption and patronage. Many of these fees were likely funnelled upwards to superiors in a quid pro quo for access to public sector employment. See 'The System of Administrative and Political Corruption: Canal Irrigation in South India,' *Journal of Development Studies* 18, no. 3 (1982).

<sup>41</sup> Brian Min and Miriam Golden, 'Electoral Cycles in Electricity Losses in India,' *Energy Policy* 65 (2014).

<sup>42</sup> Kale, *Electrifying India*, 149.



source. If power policy favoured certain elites—albeit within a low-level equilibrium that in the longer term was suboptimal for all users—it was not the industrial capitalists of the Capitalocene thesis who were the prime beneficiaries. Instead, the scarcity of electricity combined with the corrosive political economy of power subsidies to prevent the consolidation of fossil capitalism.

#### 4. Governing scarcity

If societal contests over scarce power threatened fossil capitalists' access to this key energy input, the distortionary effects of scarcity also reached deep into the state itself, in ways that would perpetuate and exacerbate shortages. Administering scarcity is in some sense the organizing principle of all mainstream economics and public policy planning, as noted elsewhere in this volume. Yet neoclassical economic rationality—the archetypical capitalist mode of public governance—developed in parallel with the high noon of fossil capitalism and the prospect of limitless growth that abundant energy promised. Mitchell goes as far as to argue that there was no such concept as 'the economy' before the development of grid electricity or cheap oil.<sup>43</sup> Capitalocene literature similarly argues that one of the hallmarks of fossil capitalism was its commodification of the natural world: the gradual extension of prices and 'the cash nexus' to everything, dating this moment to colonial expansion in particular.<sup>44</sup> Again, then, how did this capitalistic ideology of public governance fare where the expansionary dynamic that underlay it in the global North was missing?

In the Indian power sector, the endemic and highly politicized character of scarcity helped to undermine the consistent application of a recognizably capitalistic mindset in

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<sup>43</sup> Mitchell, 'Rethinking Economy,' *Geoforum* 39, no. 3 (2008); *Carbon Democracy*. While Fredrik Albritton Jonsson disputes Mitchell's belated dating, he agrees that mainstream postwar economics rests on a promise of cornucopianism; see 'The Origins of Cornucopianism: A Preliminary Genealogy,' *Critical Historical Studies* 1, no. 1 (2014): 152.

<sup>44</sup> See especially Jason W. Moore, 'The Rise of Cheap Nature,' in *Anthropocene or Capitalocene? Nature, History, and the Crisis of Capitalism*, ed. Jason W. Moore (Oakland, CA: PM Press, 2016).

electricity governance, either at the state apex or within the implementing bureaucracy. Inside the public electricity utilities, the logic governing power was ‘administrative’ rather than economically rational—the organizational corollary of fossil developmentalism rather than fossil capitalism. As the French economist Joël Ruet found after years of ethnographic research, ‘what is decided on paper counts more than what actually happens’; SEB officials typically operated in a system driven by procedures and paperwork, in which cost–benefit analysis and profitability was an ‘alien notion’.<sup>45</sup> They consequently failed to take simple profitable measures like timely repairs, preventive servicing, or anticipated investments. Meanwhile, under pressure from political administrations data were massaged. Figures on electricity theft were systematically depressed. Losses were instead attributed to subsidies on wealthy farmers, costs which SEBs could at least in theory claim back from State governments, although many of the latter did not reimburse them in full.<sup>46</sup> State politicians meanwhile exploited soft budget constraints, the classic moral hazard of the socialist ‘economy of shortages’, knowing that they would rarely be penalized for their short-termist financial management.<sup>47</sup>

As in the Soviet Union,<sup>48</sup> the apex planning apparatus began to give way under such persistent difficulties with implementation and faulty data. Under pressure to display results in accordance with the apex vision of fossil developmentalism, power planning increasingly became a utopian ritual detached from these realities, explaining away failure while setting unrealistically ambitious targets to correct for past shortfalls. In 1983 the Planning Commission’s own journal, *Yojana*, lamented the ‘total chaos’ in power planning: ‘If one were to cite an example where the government says one thing and acts quite differently while

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<sup>45</sup> Joël Ruet, *Privatising Power Cuts? Ownership and Reform of State Electricity Boards in India* (New Delhi: Academic Foundation; Centre de Sciences Humaines, 2005), 46, 43.

<sup>46</sup> This was evidenced by the sudden upward spike in transmission and distribution loss figures across States as the World Bank applied pressure for accurate estimates in return for loans in the late 1990s.

<sup>47</sup> János Kornai, *Economics of Shortage*, 2 vols. (Amsterdam; London: North-Holland, 1980). State-level power utilities have enjoyed three central bailouts over the past fifteen years, for example.

<sup>48</sup> See, for example, Alec Nove, ‘The Problem of “Success Indicators” in Soviet Industry,’ *Economica* 25, no. 97 (1958).

implementing, the energy sector may take the cake.’<sup>49</sup> Glorious futures were projected on paper, while in reality targets were missed with glaring consistency (Table 1). Not only did the contested politics of distribution shift to the detriment of fossil capitalists, then, but managing resource allocations in the context of electrical, financial, and human capital shortages also placed intolerable demands upon the state administration, in which the conventional economic rationality of profit maximization was subordinated to alternative logics.

**Table 1. Repeatedly missed targets in the power sector**

Five-Year Plan	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th
% generation capacity addition target achieved	84.6	64.3	64.2	49.5	81.6	72.3	96.2	53.8	47.5	51.76	69.84

Figures from the Planning Commission’s Five-Year Plans (New Delhi: Government of India, various years)

By the economic opening of 1991, the power sector’s problems were obvious and widely acknowledged. Power generation was the first major sector opened to private investment that year, ushering in a quarter-century of attempted reforms. Yet the multiple and overlapping character of scarcities in the power system complicated any solution. Policymakers often misdiagnosed or misprioritized the core scarcities, so that reforms either failed to tackle scarcity or even produced simultaneous overabundance and scarcity in different segments of this complex industry. In this way the politicized allocation of electricity between competing elites and the failures of apex power planning interacted to perpetuate the sector’s persistent low-grade crisis.

The initial phase of reforms after 1991—the introduction of independent power producers (IPPs)—targeted the generation segment. This measure, attempted in many Asian

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<sup>49</sup> Quoted in Smith, ‘India’s Power Crisis,’ 381. See also Elizabeth Chatterjee, ‘Dissipated Energy: Indian Electric Power and the Politics of Blame,’ *Contemporary South Asia* 20, no. 1 (2012).

countries, nominally echoed the early stages of a model developed in the global North which fit the pattern of abundance and commodification highlighted above. Developed in England & Wales (alongside New Zealand) in the 1980s, pre-existing cheap infrastructure and cheap North Sea gas permitted the introduction of competitive markets that treated electricity as a commodity rather than a core service. Under the aegis of the World Bank, this post-Keynesian energy regime would become consolidated into a blueprint for global power reform.<sup>50</sup>

In India, however, the rationale for reform was quite different to the solidifying commodification framework. By 1991 the country was facing a serious balance-of-payments crisis and turned to the International Monetary Fund for an emergency loan. The balance-of-payments crisis became the lens through which the dilemmas of the power sector were reframed. Not the mismanagement and politicization of distribution but scarce finance was the overriding concern, as became evident when the reform amendment was introduced in Parliament.<sup>51</sup> The IPP policy ill fit the sector's more fundamental problems, neglecting entirely the distribution segment. Its appeal lay in the perceived need to access capital, especially foreign finance, and to increase generation at virtually any cost.

This concern with increasing generation capacity—'pouring more water in the leaky bucket', in one commentator's memorable phrase<sup>52</sup>—has been a hallmark of Indian power reforms. Renewable energy sources have been persistently plagued by underinvestment in transmission infrastructure, which has left assets underutilized or exacerbated grid instability problems, for example in Tamil Nadu's prodigiously wind-heavy power system. The ultra mega

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<sup>50</sup> See World Bank, *The World Bank's Role in the Electric Power Sector* (Washington, DC: World Bank, 1993).

<sup>51</sup> Kale, *Electrifying India*, 54.

<sup>52</sup> Deepak Parekh, then chairman of the Infrastructure Development Finance Corporation, quoted in N. Ramakrishnan, 'Decade of Power Reforms—Hardly Electrifying,' *Hindu Business Line*, 4 September 2001.

power projects of the 2000s or the recent surge in private thermal capacity have also continually run up against the old problems of subsidy politics in many States.<sup>53</sup>

Later phases of power reform did belatedly attempt to tackle the politics of distribution, first through restructuring SEBs and the import of independent regulatory agencies, and later through ambitious legislation. Since the Electricity Act of 2003, the Government of India has hoped that competition—primarily through ‘open access’ to the retail market for large consumers—would force power governance reform. Distribution remains the purview of the State governments, however, which are typically loath to alienate the sizeable and wealthy constituencies who currently benefit from subsidized tariffs and theft, yet equally loath to lose lucrative industrial and commercial consumers; they have all but blocked open access in practice. More than this, competition may be structurally difficult to legislate: it requires good data, a serious private sector presence, improved governance, and pricing reforms—all of which remain in scarce supply.

The persistent crisis of power distribution has led to the coexistence of abundance in some sectors with continued scarcity at the street level. Recently the crisis of coal supply for thermal power plants that characterized the first half of this decade has abruptly shifted in the face of swifter mining by the state-owned behemoth Coal India Limited. Today India instead faces a major glut of thermal power, with up to one-third of plants lying idle and power sold on exchanges at rates that barely cover the cost of fuel.<sup>54</sup> State governments proudly announce that they now enjoy a ‘power surplus’. This privately sponsored crisis of overinvestment, mirroring China’s state-driven glut, will only be exacerbated by the current push for a vast expansion of renewable energy.

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<sup>53</sup> See Navroz Dubash, Sunila Kale, and Ranjit Bhavirkar (eds.) *Mapping Power: The Political Economy of Electricity in India’s States* (Delhi: Oxford University Press, forthcoming).

<sup>54</sup> Around one-tenth of Indian power is now traded on short-term power exchanges. The remainder continues to be sold largely through long-term power purchase agreements.

This counterintuitive situation bespeaks the absence of the cost-benefit rationale that is argued to have historically accompanied the Northern avatars of fossil capitalism.<sup>55</sup> On the one hand, private firms did not always behave with long-term engagement in the sector in mind. Rather, ‘every Tom, Dick, and Harry’ poured into the thermal power sector, including many steel and cotton companies with no commercial power experience, hoping to exploit or speculate upon cheap loans and preferential access to state-administered coal blocks.<sup>56</sup> The result of this irrational exuberance was a rising proportion of stranded assets and nonperforming loans, especially in public sector banks.

More fundamentally, the politicized problems of the distribution segment remain an overriding constraint in many States, and overlap with the alternative rationalities of power governance that emerged to manage scarcity. Faced with political unwillingness to reduce the subsidy burden and haemorrhaging cash, the huge, impoverished State of Uttar Pradesh has at times all but given up on power procurement planning and instead resorted to the type of unscheduled over-drawing from the inter-State grid that helped cause the world-record blackouts of July 2012. Meanwhile, utility officials in the poor (but coal-rich) eastern State of Jharkhand appear to operate with a fixed maximum amount of spending in mind: today they are opting to ration power even while cheap sources are available via short-term markets. Elsewhere demand remains constrained by absent connections and high costs. One official thus complained that State-level boasts about power surplus were ‘like saying India is a beef-surplus country when it is mostly vegetarian’;<sup>57</sup> on-paper abundance masks persistent inequalities of access to and underinvestment in electricity. India’s fragmented federal polity thus continues to stymie the development of a fossil-capitalist power system in many areas.

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<sup>55</sup> Cases such as the collapse of Enron might warn us against exaggerating the longer-term cost-benefit rationality of Euro-American energy firms, however.

<sup>56</sup> Power Trading Corporation official, quoted in M. Rajshekhar, ‘Chhattisgarh Power Boom That Never Was,’ *Economic Times*, 25 October 2012.

<sup>57</sup> Interview, former central power official, Kolkata, 28 July 2016.

India's economic trajectory has itself been reshaped by these features. The absolute scarcity of electricity combined with mismanagement and the corrosive political economy of power subsidies to prevent the consolidation of fossil capitalism in its traditional form. Businesses consistently report that India's unreliable power supply is *the* biggest obstacle to their sustained economic growth, more so than taxation or corruption.<sup>58</sup> They have compensated in ways that distinctively shifted Indian industrialization away from the exemplary 'Capitalocene' cases of Britain and the United States. Infrastructure bottlenecks, electricity prime among them, helped to undermine the development of a large manufacturing sector like that in China. Instead the Indian economy today has been characterized by 'jobless growth' and a reliance on services, including dense clusters of IT firms with their own private power supplies. In place of traditional factories where industrialists bore the costs of power cuts, large firms sought to shift the risk onto small subcontractors who could compensate through power theft or by exploiting unwaged family labour. The result was an expansion of India's vast and growing informal economy, estimated to account for up to 90 percent of livelihoods today. Most recently, ambitious projections for demand growth made a decade ago have failed to materialize. Although on paper India is now the world's fastest-growing major economy, in practice power demand—especially from industrialists—is not rising in line with these figures as historical precedent would lead us to expect. In such ways the shape of India's fossil capitalism was fundamentally altered by electric scarcities: not solely or even primarily the 'hard' scarcity of limited fuel supplies or power generation capacity, but by the competitive political economy of scarce electricity allocation, and the troubled planning apparatus for managing shortages.

## 5. Conclusion

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<sup>58</sup> Sadiq Ahmed and Ejaz Ghani, *South Asia: Growth and Regional Integration* (Washington, DC: World Bank, 2007), 11.

While the dilemma of abundance forms the backdrop to climate change in the global North, electricity in India has throughout its history been characterized by multiple and overlapping scarcities of capital, technology, personnel, lucrative consumers, and natural resources. Looking at this critical case, the dynamics and hegemony of fossil capitalism look quite different to the assumptions of the Capitalocene narrative. The foregoing analysis has troubled three elements of this narrative: the spread of electricity as a key macro-technology of fossil capitalism; the degree of dominance enjoyed by fossil capitalists over this crucial industrial input; and the expansion of a capitalistic economic rationality that seeks to commodify energy, and indeed all of ‘nature’, within a profit-making framework.

Against the Capitalocene assumption that the European mode of production was disseminated in a seamless and mechanistic manner, the British imperial government in the subcontinent was surprisingly indifferent to electrification. Grid electricity was installed only haphazardly across a few favoured areas, often relying on local entrepreneurship. This unsettles the notion of any simple relationship between colonialism, fossil capitalism, and climate change. Instead colonialism produced a new scarcity in electricity both through the visible successes of electrified, industrial modernity in the metropole and the relative neglect of electrification in the peripheries, as nationalists argued. The relative scarcities produced by lack of technology transfer became a defining feature of the construction of a ‘developing world’.

Even after independence in 1947, fossil capitalists did not enjoy a consistent acceleration of electricity provision. Questions of distribution became politicized and institutionally conditioned by the democratic context and federal structure. A distinctive politics of elite democratic mobilization and power rationing emerged across many Indian states, in which subsidized overuse coincided with deliberate cuts, penalizing industry alongside the hundreds of millions of Indians left without access to the grid. The public management of such endemic scarcity looked very different to the economic rationality that emerged to govern the abundant



resources of the global North. Against the equation of the Anthropocene with capitalist commodification, electrification did not coincide with the installation of a commercial, cost-benefit logic across the country. In many utilities, scarcity was not conceptualized in purely economic terms. Instead, the public management of scarcity was guided by a noneconomic rationality shaped around administrative protocols and political exigencies. Simultaneously, scarcity contracted political time horizons. Power planning became increasingly divorced from the realities of short-term, zero-sum calculations around regional political economies of resource allocation and soft budget constraints. Fierce competition for scarce resources thus undermined long-term ‘developmental’ state planning and market-based policies alike.

Alongside the ‘hard’ absolute scarcity of electricity generated, the underperformance of India’s electricity sector shows the importance of ‘soft’, politically mediated scarcity created by inequalities of access and the institutional complex that evolved to govern them. This distinction has often been neglected by Indian policymakers, who have often favoured the easier solution of increasing generation capacity over the riskier work of subsidy rollbacks or organizational reform. As this suggests, scarcity’s multiple forms (physical, financial, human capital, and more) have led to misdiagnoses of the sector’s problems, so that overabundance and scarcity have come paradoxically to coincide. Nonetheless, the line between hard and soft scarcities is blurred. Both are manmade. Both are inseparable from the external world, whether through natural resource constraints, electricity’s physical characteristics (such as the inevitability of technical losses during low-voltage distribution), and their environmental implications. And both are mutually conditioning, as conditions of persistent hard scarcity shape demand politics and governance, and subsidies and mismanagement in turn discourage investments upstream.

India’s variant of fossil developmentalism was itself reshaped by the pressures of the politically mediated scarcity of electricity. This and other infrastructural bottlenecks helped to discourage the conventional growth of factory-based manufacturing in favour of services and a

vast informal economy in which own-account workers shouldered the risk of breakdowns. None of these features—electricity’s dissemination around the subcontinent, the political economy of the Indian power sector, the non-commercial logic of power governance, and India’s unusual industrial trajectory—are well captured by Anthropocene-Capitalocene literature derived from Euro-American experiences founded on energy abundance.

Meanwhile, the threat of climate change itself has prompted a move to revalue scarcity. India’s dysfunctional power system had one beneficial side effect from a long-term, global perspective: energy production and consumption was constrained. Such energy-scarce late development has been reconfigured as a moment of opportunity to move beyond fossil capitalism and its environmental consequences, either to alternative fuels or, more radically, towards more parsimonious modes of living. In this vein India’s power cuts are occasionally reinterpreted with only a little irony as a prodigiously well-developed system of ‘demand-side management’. Nonetheless, the domestic allure of this revaluation is limited. The right to overcome the persistent scarcity of power—to ‘develop’—has long remained the pillar of India’s international climate negotiating stance.<sup>59</sup> Abundant electricity is at present a non-negotiable component of modernity. The history of electrification in India thus illustrates the complexity of the much-debated relationships between voracious energy consumption and industrial capitalism, colonialism, and democracy outside the global North—relationships which look unlikely to become less fraught in the near future. As revealed here, the postcolonial Anthropocene is defined as much by the perception of relative scarcity as by the dilemma of abundance.

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<sup>59</sup> Navroz K. Dubash, ‘The Politics of Climate Change in India: Narratives of Equity and Cobenefits’, *WIREs Climate Change* 4, no. 3: 191–201 (2013).